



Debris Estimation Field Guide

Indiana Department of
Homeland Security

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This field guide has been designed to serve as a quick reference tool to be utilized by teams conducting debris (quantity and cost) estimation for a Public Assistance (PA) damage assessment.

Federal Emergency Management Agency (FEMA) PA Program debris eligibility and quantification methods and tools are listed. Ineligible debris should also be identified, classified and quantified in a debris estimation damage assessment. *It may be eligible under another funding source.*

A hardcopy draft of the Debris Estimation worksheet is available in the PA toolbox (IDHS Recovery Web Page) to document debris team findings of both eligible and ineligible debris. A digital spreadsheet is in process.

SAFETY FIRST!

- Attend the Safety Briefing given by your Safety Officer.
- You are responsible for your personal safety at all times.
- Always wear personal protective equipment in accordance with your agency's safety protocol.
- **Avoid safety risks!**
- If faced with an emergency in the field:
 - Remove yourself from the situation
 - Call 9-1-1 if appropriate
 - Contact your direct supervisor immediately



WHY ARE YOU ESTIMATING DEBRIS?

- **Damage assessment for eligibility of FEMA's Public Assistance Program, a cost share reimbursement**
 - *To meet FEMA State Threshold – approximately \$9,000,000.00 of eligible damage (to include debris)*
- To determine if the recovery effort is beyond state and local capabilities
- Statistical information for government officials and the media
- A Natural Resources Conservation Service (NRCS) eligible damage assessment





TYPES OF DEBRIS

- Woody/vegetative
- Construction/demolition
- Soil/sand/mud
- Household furnishings (flood debris)
- Household hazardous waste
- Metals



WHAT IS ELIGIBLE UNDER THE FEMA PUBLIC ASSISTANCE PROGRAM?

- Public roads/right-of-ways
- The area under bridges
- Grounds of public buildings
- Public parks and recreation areas
- Rural Electric Membership Corporation (REMC) right-of-ways
- Most Not-for-Profit utility right-of-ways
- Household flood debris (with FEMA approval)





WHAT IS NOT ELIGIBLE UNDER THE FEMA PUBLIC ASSISTANCE PROGRAM?

Homes (*IA, SBA, INSURANCE)

Businesses (*IA, SBA)

Fields (*NRCS)

Wooded areas

Streams/right-of-ways (*NRCS)

Vehicles (*INSURANCE)

*possible funding source

*IA—Individual Assistance
Program*

*SBA— Small Business Ad-
ministration*

*NRCS- Natural Resources
Conservation Service*



DEBRIS ESTIMATION TECHNIQUES

- Visualization techniques
- Ground measurements
- U.S. Army Corps of Engineers (USACE) formulas
- Aerial photography
- Geographic Information Systems (GIS)
- Auditor's records
- Combination of techniques



VISUALIZATION TECHNIQUES

Cubic Yards (CY)

How to Compare:

Porto-Pot = 2 CY



Tandem-axle Dump
Truck (INDOT yellow
truck) = 13 CY



Recycle Roll-off
(15' x 6' x 6') = 20 CY



Dump Trailer
(42' x 8.5' x 6') = 84 CY



GROUND MEASUREMENT TECHNIQUES

- Equipment

- Measuring wheel
- Tape measure
- Vehicle odometer
- Walk off (measure by stride)
- Laser

- Estimating aids:

- Defining debris area
- Formulas
- Tables



USACE DEBRIS ESTIMATION FORMULAS

One-story Building

$$\frac{L' \times W' \times H' \times 0.33}{27} = \text{\#CY}$$

Mobile Home

$$\frac{L' \times W' \times H'}{27} = \text{\#CY}$$

Debris Piles

$$\frac{L' \times W' \times H'}{27} = \text{\#CY}$$

USACE FORMULA FOR IN-HOME FLOOD DEBRIS THAT WILL BE MOVED CURBSIDE

This formula is used to calculate the debris quantity from a flood event (only when the structure is not destroyed).

Formula:

$$\text{Square Footage} \times 0.02 = \text{CY of Debris}$$



AERIAL PHOTOGRAPHY TECHNIQUE

Mobile home park debris estimation:

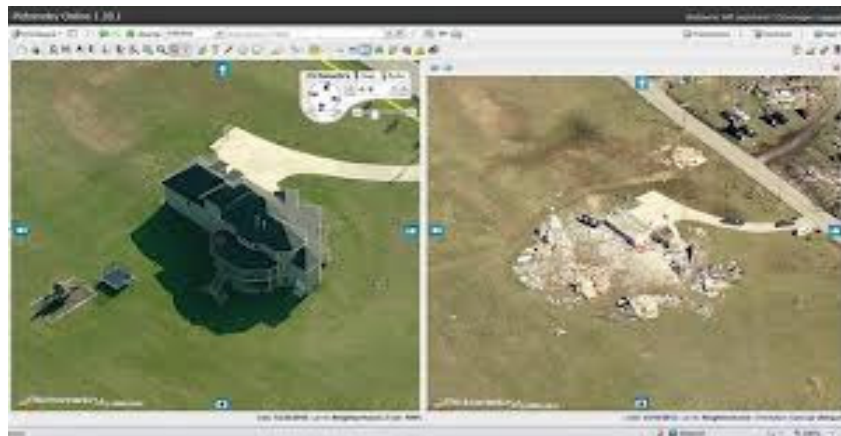
Typical single-wide = 290 CY

Typical double-wide = 415 CY



NON-FIELD WORK TECHNIQUES

- Geographic Information Systems (GIS)
- Auditor office information (home/ building info)
- Aerial photography (compare before/ after)
- Other estimation or combination techniques



ESTIMATION SHORT CUTS

- One-acre football field (43,560 SF)
full of debris piled 10 feet high:

$$\frac{43,560 \text{ SF} \times 10 \text{ FT}}{27} = 16,133 \text{ CY}$$

- Truck beds are measured and tagged
in cubic yards by the manufacturer



**USACE/FEMA SHORT CUT FOR
PERSONAL PROPERTY PLACED ON A
PUBLIC RIGHT-OF-WAY**

- Slab-on-grade home: 25 - 30 CY
- Home with a basement: 45 - 50 CY



CONVERSION FACTORS

- Construction and demolition debris
 - 1 ton = 2 CY
- Mixed debris
 - 1 ton = 4 CY
- Vegetative debris
 - Hardwoods: 1 ton = 4 CY
 - Softwoods: 1 ton = 6 CY

Common Measurements

1 Yard	3 Feet
1 Mile	5,280 Feet
1 Mile	1,760 Yards
1 Acre	43,560 Square Feet
1 Mile Square	3,097,600 Square Yards
1 Mile Square	640 Acres
1 Cubic Yard	27 Cubic Feet

Roads/Right of Way

Rod	16.5 Feet
Rural Road	2 Rods
Residential ROW (road, sidewalks, etc)	4 Rods

[illegible]

CONTACT INFORMATION

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